

What is claimed is:

CLAIMS

1. An vibration control system for use with a fabricating system, said vibration control system comprising:
- an actuator assembly for controlling vibration;
  - a sensor for detecting at least one parameter of displacement of said fabricating system and producing a signal in response thereto; and
  - a circuit in electrical communication with said actuator assembly and said sensor;
- wherein, upon the detection of said at least one parameter of displacement by said sensor, said sensor signals said circuit, which, in response, activates said actuator assembly to control vibration.
2. The vibration control system of claim 1, said actuator assembly comprising an actuator selected from the group consisting of a strain actuator, an electroactive strain actuator, a piezoceramic strain actuator, and an electroactive stack actuator.
3. The vibration control system of claim 1, said actuator assembly comprising at least two actuators.
4. The vibration control system of claim 1, said actuator assembly comprising
- (a) an electroactive element;
  - (b) a conductor; and
  - (c) an insulator;
- wherein said electroactive element, said conductor, and said insulator are bonded together such that in-plane strain in said electroactive element is shear coupled between said electroactive element and said insulator.

5. The vibration control system of claim 1, said sensor being selected from the group consisting of a strain sensor, an accelerometer, a laser displacement sensor, and a laser interferometer.
6. The vibration control system of claim 1, said sensor comprising at least two sensors.
7. The vibration control system of claim 6, said at least two sensors being capable of producing at least two different signals.
8. The vibration control system of claim 7, wherein said circuit interprets said at least two different signals as the sum difference between the two different signals.
9. The vibration control system of claim 1, wherein said sensor also detects an aspect of performance of the fabricating system.
10. The vibration control system of claim 1, wherein said fabricating system is a system for fabricating electronic components, the components being selected from the group consisting of semiconductor chips, printed circuit boards, liquid crystal displays, and thin film devices.
11. The vibration control system of claim 11, wherein said actuator assembly controls vibration of the fabricating system thereby increasing the accuracy of the system for fabricating electronic components.
12. The vibration control system of claim 11, wherein said actuator assembly controls vibration of the fabricating system thereby increasing fabrication throughput of the system for fabricating electronic components.
13. The vibration control system of claim 1, wherein said fabrication system is selected from the group consisting of a pick and place system, a lithography system, and a liquid crystal display manufacturing system.

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14. The vibration control system of claim 1, wherein said fabricating system is a system for fabricating electronic components, and wherein the vibration is produced from a disturbance external the system for fabricating electronic components.
15. The vibration control system of claim 1, wherein said fabricating system is a system for fabricating electronic components, and wherein the vibration is produced from a disturbance internal to the system for fabricating electronic components.
16. The vibration control system of claim 1, wherein said fabricating system is a system for fabricating electronic components comprising a lens assembly, a wafer stage, and a support structure for supporting the lens assembly and the wafer stage.
17. The vibration control system of claim 16, wherein said sensor detects displacement of the lens assembly relative to the wafer stage, and signals the circuit which, in response, signals said actuator assembly such that said actuator assembly decreases said displacement.
18. The vibration control system of claim 16, said vibration control system being secured to said support structure.
19. The vibration control system of claim 15, wherein said fabricating system comprising a component selected from a group consisting of a step motor, a DC motor, a hydraulic actuator, and a pneumatic actuator, and wherein said vibration is caused by said component.
20. The vibration control system of claim 1, wherein said actuator assembly is detachably secured within the vibration control system.
21. The vibration control system of claim 1, said vibration control system further comprising an electrical connection coupling said vibration control system to the fabricating system, and wherein said electrical connection communicates a signal to or from the vibration control system, said signal being selected from the group consisting of an able/disable signal, a system status signal, and a fault/error signal.

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22. The vibration control system of claim 1 further comprising a control system having at least one controller that produces a signal, and which is in electrical communication with said circuit, and wherein said circuit activates said actuator assembly in response to the signal from the controller.

23. The vibration control system of claim 22, wherein said signal from said controller relates to linear displacement, auto-tuning, gain scheduling, external gain control, feed forward control, or feed back control.

24. A method of controlling a vibration in a gantry, the method comprising the steps of:

(a) bonding the vibration control system of claim 4 such that the system is shear coupled to said gantry, and such that in-plane strain of the electroactive element mechanically acts on the gantry through said insulator when an electrical signal is applied to said conductor; and

(b) applying an electrical signal to said conductor.

25. An vibration control system for use in a fabricating system, said vibration control system comprising:

an actuator assembly for controlling vibration; and

a circuit in electrical communication with said actuator assembly;

wherein said circuit signals said actuator assembly to control vibration of said fabricating system.

26. An vibration control system for use with a fabricating system, said vibration control system comprising:

an actuator assembly for controlling vibration;

a sensor for detecting at least one parameter of performance of said fabricating system and producing a signal in response thereto; and

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